DOCUMENT RESUME

ED 133 855 EA 009 109

AUTHOR Bloom, Benjamin S.
TITLE Evaluation, Instruction and Policy Making. IIEP Seminar Paper: 9.
INSTITUTION United Nations Educational, Scientific, and Cultural Organization, Paris (France). International Inst. for Educational Planning.
PUB DATE 75
NOTE 22p.; A contribution to the IIEP Seminar on "The Evaluation of the Qualitative Aspects of Education" (September 30-October 4, 1974) ; For related documents, see EA 009 106-111 and EA 009 113-116; Some pages may be marginally legible due to print quality of original
AVAILABLE FROM IIEP Publications, 7-9 rue Eugene-Delacroix, 75016 Paris, France (3.00 francs)

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS Curriculum; Educational Alternatives; *Educational Assessment; Educational Innovation; *Educational Objectives; Educational Testing; Elementary Secondary Education; Evaluation Methods; Mastery Learning; *Measurement Techniques; Student Evaluation

ABSTRACT

Recently, educational evaluation has attempted to use the precision, objectivity, and mathematical rigor of the psychological measurement field as well as to find ways in which instrumentation and data utilization could more directly be related to educational institutions, educational processes, and educational purposes. The linkages between educational purposes and educational evaluation are so strong that systematic workers in most areas of educational research or practice start with this almost as the first step in their work. The actual materials of instruction and the observation of teaching-learning situations can be analyzed to determine the appropriate evaluation procedures, and, in turn, the relations between the stated objectives, the learning experiences available to students, and the evaluation procedures can be determined in great detail. Evaluation instruments serve as models for teaching and learning and, as such, help to guide both instruction and student learning. Mastery learning is one way in which evaluation can be integrated in teaching/learning. Evaluation techniques are also available to measure the effectiveness of interaction and learning in innovative and alternative programs. Increasingly, educational evaluation is seen as a quality control measure. (Author/IRT)

Documents acquired by ERIC include many informal unpublished materials not available from other sources. ERIC makes every effort to obtain the best copy available. Nevertheless, items of marginal reproducibility are often encountered and this affects the quality of the microfiche and hardcopy reproductions ERIC makes available via the ERIC Document Reproduction Service (EDRS). EDRS is not responsible for the quality of the original document. Reproductions supplied by EDRS are the best that can be made from the original.

ED133855

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL BY MICROFICHE ONLY HAS BEEN GRANTED BY

UNESCO

TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER"

IIEP seminar paper: (9)

EVALUATION, INSTRUCTION AND POLICY MAKING

Benjamin S. Bloom

A contribution to the IIEP Seminar on "The evaluation of the qualitative aspects of education"
30 September - 4 October 1974

INTERNATIONAL INSTITUTE
FOR EDUCATIONAL PLANNING
(established by Unesco)
7-9, rue Eugène-Delacroix, 75016 Paris

© Unesco 1975

EA 009 109

The opinions expressed in these papers are those of the authors and do not necessarily represent the views of the Institute or of Unesco.

CONTENTS

		Page
1.	BACKGROUND	1
2.	EDUCATIONAL PURPOSE AND EDUCATIONAL EVALUATION	2
3.	EDUCATIONAL EVALUATION AS MODELS FOR TEACHING AND LEARNING	4
4.	EVALUATION TO DETERMINE THE EFFECTIVENESS OF INSTRUCTION AND LEARNING	10
5.	EDUCATIONAL EVALUATION AND EDUCATION	14
6.	IMPLICATIONS	17
BIBLIOGRAPHY		18

EVALUATION, INSTRUCTION, AND POLICY MAKING

By
B. S. Bloom
Professor of Education
University of Chicago

1. Background

Although educational measurement has existed in some form or other for several thousand years, much of its development into a complex art and technology has taken place during the 20th Century. During much of this century the field has been dominated by the ideas of psychologists, psychometricians, and statisticians. It is only within the past few decades that educational evaluation has sought to free itself from these ancillary fields in order to find clearer roots in the educational process and educational concerns and problems.

Psychological and educational measurement was primarily concerned with the development and utilization of instruments that could be used for prediction, selection, and certification in relation to students and student achievement. Such functions could be served by specialists far removed from education and educational processes in the schools. And, in fact, most of the educational measurement specialists were trained in psychology and statistics with little grounding in the field of education or even educational psychology.

The more recent field of educational evaluation has attempted to make use of the precision, objectivity, and mathematical rigor of the psychological measurement field, but in addition has sought to find ways in which instrumentation and data utilization could more directly be related to educational institutions, educational processes, and educational purposes. In this paper, I will attempt to sketch some of the major dimensions of this work as they appear at this time. I am confident that this field will develop in many new ways and that we can only dimly perceive a few of the major lines this work will take in the future.

?. Educational purpose and educational evaluation

Educational purposes, goals, and objectives have been with us since the beginning of formal education. Expressed in verbal form these statements of intentions were useful in giving a general direction to the educational institution, but only rarely were they operational statements which guided either the teacher or the learner.

In sharp contrast, the instruments for educational measurement (external examinations, teachers' tests and final examinations, standardized tests, etc.) have always had a controlling force on what was taught and, even more, on what was learned by students. Since the major rewards and penalties of an educational system are tied to its certification and grading procedures, which in turn are dependent on its examination procedures, the teaching-learning activities of teachers and students are to a large extent guided by what they expect will be tested on these examinations. And, in countries throughout the world, the examination procedures have been largely limited to a single objective --the testing of recall of specific information about each school subject.

Perhaps the major innovation of educational evaluation was the development of ways in which the evaluation process could be integrally related to the educational purposes of the classroom, the school, and the national educational system. Much progress in this work has been documented in the many books on educational evaluation, taxonomies of educational objectives, and curriculum evaluation. While there are many differing views about how the objectives should be defined, who has responsibility for determining the objectives, and the precise procedures for evaluating each objective, there is much concensus throughout the world on the importance of relating educational evaluation to educational purposes.

Starting with the pioneering work of Ralph Tyler in the 1930's, the development of evaluation procedures for specific types of educational objectives has moved with careful research and experimentation until it has reached the stage of what might be termed a technology. While there are still many opportunities for creativity and artistry in the construction and use of evaluation procedures, the models and techniques for developing evaluation procedures for major classes of cognitive and affective objectives have been specified in relatively clear detail. Having been involved in this work for over three decades, I have been surprised and delighted to find that most of my students can develop the necessary skills for this work in 3 to 6 months in contrast to the several years necessary to develop similar skills in the 1940's. I attribute much of this to the fact that the procedures are now more clearly developed and illustrated in the many books and manuals on educational evaluation.

It is common practice now for all the major educational testing organizations to start the construction of a new educational test with a detailed set of specifications of the content and objectives to be tested and then to check the validity of the test items against the detailed specifications. Similarly, every new curriculum or research project or evaluation program starts with the specifications to be met in terms of content and objectives, then develops instruments, sampling procedures, research design, and data analysis in terms of these specifications. The point is that the linkages between educational purposes and educational evaluation are so strong, that systematic workers in most areas of educational research or practice start with this almost as the first step in their work. Also, the detailed procedures for making the linkages are so well developed that evaluation workers can be trained to do it well in much less time than was true several decades earlier.

3. Educational evaluation as models for teaching and learning

One of the consequences of the linkage between educational purpose and educational evaluation is that the evaluation procedures become operational definitions of educational purposes. It is now possible to classify the items, problems, and procedures being used in examinations, tests, questionnaires, observational forms, and other evaluation material and techniques to determine what purposes are being respresented by the evaluation techniques. Thus, as in the IEA studies, a collection of the evaluation procedures being used within a nation when properly analyzed give more operational information about the educational objectives of a subject of study or curriculum of a school or country than does the verbal statements about the course or curriculum (Bloom, 1974).[1]

Furthermore, the actual materials of instruction and the observations of teaching-learning situations can be analyzed to determine the appropriate evaluation procedures and in turn the relation between the stated objectives, the learning experiences available to students, and the evaluation procedures can be determined in great detail. From these analyses, one can get a better picture of the kinds of learning being developed in a classroom, school, or entire educational system than is likely to be true from observations which might take several years to carry out. These analyses are very effective in predicting (and accounting for) the kinds of learning eventually found on major national or international survey instruments such as those found in the IEA studies,[2] Plowden Report,[3] and Coleman Report.[4]

But, there are even more important consequences of the linkage between educational purpose and educational evaluation. One can determine where the linkeages are distorted between educational purposes, instruction, and evaluation. Is it that the purposes are beyond the present

capabilities of the evaluators to develop appropriate evaluation procedures? If so, then the task of training educational evaluators to construct more valid and appropriate evaluation procedures becomes clear! Is it that the teachers have not yet learned how to provide instruction for particular educational purposes? If so, then the need for pre-service and in-service education of teachers becomes clear. If the task of providing such training appears insurmountable for economic reasons or because of the present capabilities and training of the teaching staff, then can the situation be remedied by improvements in the instructional materials; by the use of radio, TV, or educational films; or by the use of peer tutoring and other special instructional procedures?

It is evident that throughout the world students attempt to learn the skills, abilities, and subject content that they believe will be emphasized in the evaluation procedures they will be judged on. If they believe this is largely rote information, they will study and prepare accordingly. If they believe they will be judged on their ability to use the ideas and processes in new situations, they will learn and prepare to demonstrate such abilities. There has been a great deal of observational studies as well as more direct experimental research on how students learn and prepare in relation to different kinds of examinations. The evidence is unmistakeable -- students will attempt to learn what they anticipate will be emphasized in the evaluation instruments on which they expect to be judged, graded, and certified. There is little doubt that a series of major changes in the evaluation procedures over a number of years can bring about great changes in the learning of the students -- probably more change than could be produced by any other single change in the educational situation. This is, of course, a two-edged sword in that negative changes (reduction in the quality of learning) as well as positive

changes (improvements in the quality of learning) can be produced by related changes in the evaluation procedures. But, the point of this relation between student learning and evaluation is that the evaluation procedures furnish models of what learning is expected and the models are clearer than the more ambiguous statements of educational purposes or the complex range of instructional materials and procedures the students have been exposed to. The clearest guide that students have as to what learning (largely cognitive) is expected of them is the evaluation instruments on which they will be judged and graded.

Similarly, teachers are also guided by the evaluation procedures as to what they are to teach and what will be expected of their students. Even when the evaluation procedures are made by the teacher himself, they define the end learning products of his teaching and he strives to prepare his students to do well on these evaluation instruments. If the evaluation procedures largely deal with rote types of learning, teachers will prepare their students for such types of evaluation. If the evaluation procedures largely deal with application of ideas to new problems (such as are exemplified in open-book examinations where students may refer to their notes or books as they wish), then teachers will attempt to develop these kinds of learning in their students. It has been found that one of the most effective ways of preparing teachers to teach higher mental processes is to develop skills for testing such processes in the teachers and to help them include problems of the appropriate type in their own evaluation procedures.

Evaluation as an integral part of instruction and learning

Evaluation instruments do serve as models for teaching and learning and as such help to guide both the instruction as well as student learning. Evaluation used this way is largely a perceptual phenomena in that teachers

and students have expectations as to the evaluation procedures to be used (sometimes incorrectly) and guide their efforts by their anticipations. Thus, the evaluation procedures serve to indicate the goals to be reached at the end of some period of instruction and learning (usually the end of the academic term).

Many of us have searched for ways in which evaluation might become a more integral part of the process of teaching and learning during the actual process. We had become aware of the effects of the frequency of testing on the learning of students (typically the more frequent the testing the higher the achievement); the ways in which some teachers analyze the results of their progress tests and quizzes to determine wherein they should stress certain points, review others, and even provide special help to students who have difficulties; and the effects of the kind of testing and the frequency of testing on the preparation that students make as well as the pacing of their learning activities.

In addition, we became aware of the effects of group instruction on the differential learning of students within a class. Much of the research on classroom instruction has demonstrated that students differ in their learning even though theoretically all had equal opportunity to learn in the same classroom. We conceived of this differential learning as errors in both instruction and learning and we took the position that if errors in student learning are systematically corrected at each stage in the learning process there should be little variation in the final outcomes as measured by a summative evaluation measure. Furthermore, students who have been corrected at each stage of the learning should achieve at a much higher level than other students who have not been helped when they needed it --even though both groups of students were in the same classroom or were taught similarly by the same teacher.

This systematic corrective learning has been termed mastery learning and there are a number of teaching strategies to achieve such mastery. Central to most mastery learning strategies is the use of feedback and corrective procedures at various stages or parts of the learning process. While a variety of feedback processes are possible (including quizzes, homework, workbooks, etc.) it has been found that the development and use of brief diagnostic tests has proven to be most effective. Such diagnostic or formative tests are intended to determine what each learner has learned in a particular unit, chapter, or part of the course and what he still needs to learn. In general, these formative tests are not used to grade or judge the student and their main value is in providing feedback to both teachers and students on what aspects or elements of the learning unit still need to be mastered. The success or failure of mastery learning work is clearly related to the degree of efficiency of these formative tests in pinpointing the learning needs of each student.

However, the key to the success of mastery learning strategies largely lies in the extent to which students can be motivated and helped to correct their learning difficulties at the appropriate points in the learning process. Many teachers have been very effective in motivating students to do the necessary additional work and in finding ways of providing the correctives they need. The research done so far in the United States, Canada, S. Korea, and a number of other countries suggests that the development of a student partner system or providing opportunities for groups of 2 or 3 students to work together are very effective methods of motivating each student to make the correctives and in addition this provides the additional time and help each student needs. Teacher aides, programmed instruction, audio tapes or cassettes, and other instructional material appear to work well in particular situations. In most cases

throughout the world, the corrective work following the formative test feedback is done outside of the regular classroom time.

In the many studies reported by Block (1971,1974)[5] and by Peterson (1972)[6] there is considerable evidence that mastery learning procedures do work well in enabling about 80% of students to reach a level of achievement which less than 20% of students attain under non-mastery or conventional teaching methods. The time costs for the mastery learning is typically of the order of 10% to 20% additional time over the classroom scheduled time --for those students who need it. In a number of studies, it has been found that the extra time and help needed decreases until toward the end of the course little or no correctives are needed to attain the criterion of mastery on the formative tests. (Bloom, 1973).[7]

While there are many different approaches to the improvement of both instruction and learning through mastery as well as related procedures, the effectiveness of most of these approaches is dependent on the use of feedback and corrective procedures. Evaluation plays a central role in providing the feedback on the effects of instruction as well as on the effectiveness of the corrective procedures. Properly used the evaluation is looked upon by both teachers and learners as an indispensable tool for instruction and learning, especially when the formative evaluation is not used to grade or judge either teacher or student.

Many countries have been experimenting with different mastery learning strategies. Typically, they are finding that after the formative tests and corrective procedures are developed by evaluation and curriculum specialists, the costs of mastery learning strategies are negligible. Furthermore, they are finding that the outcomes in terms of final achievement, student attitudes toward the learning, and improvement in student general ability to learn under school conditions are so great as to represent positive

human development in its own right as well as economic benefits which are far greater than might be expected from the time or other costs incurred.

However, for the purposes of this paper, the main point to be stressed is that the use of evaluation as an integral part of instruction and learning has enormous consequences. We must continue to search for additional effective ways in which evaluation can contribute to the teaching-learning process- as an integral part of that process.

4. Evaluation to determine the effectiveness of instruction and learning

Much of the use of evaluation has been to determine the learning outcomes of particular types of curriculum and instruction. Typically, the attempt has been made to construct evaluation procedures that are appropriate to a particular educational program, curriculum, or instructional approach. Then, an appropriate research design and sampling procedure has been chosen to determine whether in fact the educational program, course, etc. did have specific traceable effects on the student learning.

The use of evaluation procedures in the development and appraisal of a new curriculum has already been ably presented by Dr. Lewy so I will say little more on this.

Rarely does a nation restrict itself to a single educational program, curriculum, or instructional approach for all students of a particular age or grade. Evaluation is useful in determining the relative effectiveness of the different approaches to instruction and learning within a nation. Evaluation used this way has characteristically been used to determine whether alternative A is, in terms of student learning, more effective than alternatives B, C, D, etc. (alternatives may be programs, courses, curricula, teaching methods, class size, instructional strategies, etc.). In most of the research using this evaluation approach it has characteristically been

found that the "opportunity to learn" particular content and objectives in a particular alternative is highly related to the evaluation results for that alternative. That is, if students are taught x, y, and z they tend to learn x, y, and z, while if they are taught only x and z they learn accordingly. This seems so obvious that one wonders why evaluation is necessary.

However, there are great discrepancies between what an educational program is intended to accomplish, what students are actually given an opportunity to learn, and what students actually learn -- and the discrepancies have to do with what happens in particular classrooms (opportunity to learn) in relation to what was intended and the evaluation results.

Thus, the basic problem of the effects of an educational alternative is dependent on the linkages between the intended effects of an alternative (course, program, etc.), what happens in the school or classroom, and the evaluation results. If an educational program is designed to produce a particular set of results, we must insure that the appropriate use of the program actually takes place in the classroom, before we can be certain that we are really evaluating the effectiveness of the program or alternative. In response to this problem, educational evaluators and researchers now seek to establish what actually takes place in the classrooms they evaluate before claiming they are evaluating the effectiveness of the program. Increasingly, evaluators are selecting classrooms and teachers where they are certain that the program is actually being implemented in the intended ways before applying their evaluation procedures.

Once they can satisfy themselves that the classrooms or teachers are fully implementing the intended curriculum, program, or method they can determine its effectiveness as well as its difficulties. Then, the research moves to the problems of how the program can be fully implemented in other

classrooms -- training of teachers, orientation of students, appropriate materials, or the supporting conditions of morale, educational leadership, supervisors, consultants, etc. which are necessary for its full implementation with other teachers and classrooms.

Perhaps the main lesson to be learned from the attempts to evaluate new early childhood educational programs (Headstart), new programs for the disadvantaged students (compensatory education), programmed instruction, new curricula (new mathematics, new biology, physics, chemistry, etc.) and new teaching strategies is that there are great gaps between the intended new program and its full realization in the classrooms. In fact, one has to search very carefully before finding the few classrooms where the new program is fully realized. Policy makers who sponsor and give economic support to the new educational alternatives must be aware that good intentions (especially new ones) are not enough in education. The problems of how the good intentions can be fully implemented in the classroom must be solved before the new program can be evaluated.

Closely related to the foregoing points is the increasing use of evaluation to determine how an alternative can be modified and improved. New approaches to education are rarely perfect and seldom are they universal panaceas. At one time evaluation was used to determine whether alternative A was better than B, or C. It mattered little that the statistical significance of the difference between the alternatives was rarely matched by the educational or social significance of the differences.

Evaluation increasingly is used to determine not only which alternatives are superior, but also in what respects can they be further improved. A new curriculum or program may be excellent in terms of certain characteristics but should be modified in terms of other characteristics. When the evaluation and other data are properly analyzed they

reveal what is excellent about an educational alternative, what is good but could be improved, and what is poor and needs much further work.

For the educational policy maker or administrator, the basic point is that major changes in programs should be instituted only when there is clear evidence that a particular existing program is poor in all respects. Improvements and modifications in existing programs may be more effective than the creation of entirely new programs. Not only may they be improved on the basis of the evaluation evidence -- it is likely that the enormous costs (economic as well as human) of introducing great changes in teachers, materials, and educational points of view will be effective only when all aspects of the new program are working effectively in the classrooms and school. Smaller changes cause less dislocation in the schools and may, under appropriate conditions, be more effective in promoting improved instruction and student learning than will completely new programs.

A final point to be made on evaluation and effectiveness of instruction and learning is that times and conditions change. An educational program that is very effective at one time may in a number of years be less effective. A new curriculum which works superbly in year X may in year X+5 work very poorly. The deterioration of particular new programs, curricula, teaching methods has been well documented, especially in relation to some of the major educational changes introduced during the past decade in the U.S. as well as other countries.

Increasingly, educational evaluation is seen as a quality control measure. That is, carefully selected samples of students, classrooms, and schools are surveyed at particular times to determine whether a new program that worked well at one time still continues to work well. Or, to determine whether particular aspects of the program need to be modified at particular points in time if the program is to continue to work well in the classrooms.

Sometimes, it is found that the program continues to be effective with some students and some teachers or schools, but to work less well in certain respects with other students and teachers. Again, the point is that the educational policy maker or administrator must not expect that education can be a fixed and static thing. Times and conditions change and evaluation can reveal when and where the changes require modification and improvements in the educational programs.

5. Educational evaluation and education

Education in Western societies is frequently equated with schooling. We support schools to give our children and youth an education. We empower schools to give formal recognition to the amount and type of education an individual has completed by the use of credits, certificates, and academic degrees. Most of our writing and research on education deal only with schools and schooling.

Recently, this equation of education and schooling has been attacked by scholars of education as well as by more radical reformers who insist that much learning can and does take place outside the school. But equally important, research on education and research on various aspects of the society have questioned some of the relations between the school system and other subsystems in the society.

Research into the relation between the schools and the home environment has been one of the more fruitful areas of study stimulated by these questions. Home is a powerful educational environment, especially during the preschool and primary school years. Studies of home environments in the United States, as well as in several other countries, reveal the effect of the home on language development, ability to learn from adults, attitudes toward school learning, and aspirations for further education and the occupational careers and life styles associated with education. It is clear that when the home

and the school have congruent learning emphases, the child has little difficulty in his later schooling. But when the home and the school have very divergent approaches to life and to learning, the child is likely to be penalized severely by the school--especially when school attendance is required for ten or more years.

During the past half-decade we have begun to recognize some of the problems raised by disparities between home and school. One approach has been to preempt some of the years preceding regular school by placing children in preschool programs. Other attempts have been made to alter some aspects of the primary school. Still other efforts have been made to alter the home environment. There is no doubt that these attempts to alter the relations between home and school have raised many problems. The resolution of these problems and the appropriate relations between home and school will concern us for many years to come.

Schools and peer groups are increasingly in conflict, and the individual appears to learn very different things in these two subsystems of society. Especially during adolescence do we find these two subsystems diverging. The conflicts between the values emphasized by schools and colleges and the values emphasized by various peer groups raise serious questions about the ways in which these two sets of values can be more effectively related. What we desperately need are research and scholarship which will point the way to the resolution of some of the more disturbing conflicts between the schools and adolescent peer groups.

Recent research by economists attempts to understand the relationships between the economic system of a nation and its educational system. It is evident that the relations between education and economics may be very different for societies at different stages of industrialization as well as for societies which have very different political systems. The view that

education can be conceived of as investment in human capital has stimulated educators as well as economists to study the economic effects of different approaches to education. The view of education as both a consumer or cultural good and an investment in human capital alters many of our traditional views about education and its effects. This area of research raises long-term problems about the consequences of this view for support of the schools and support of students in the schools.

There are other subsystems in a nation -- religion, mass media, the political system, the status system -- which have very complex relations with education. Perhaps the main point is that education is not confined to the school system and that very complex educational and other relations are found between the schools as a subsystem and the other subsystems within a society. While we have tended to think of a system of schooling as relatively insulated from other parts of the society, it is likely that the schools will be under pressure to relate more clearly to the other parts of the social system. Undoubtedly, we will come to regard education during the school-attending period, as well as before and after this period, as most appropriately the concern of many aspects of the society. Increasingly we will try to determine what can best be learned in the schools, what can best be learned elsewhere, and what can be learned only through an effective interrelation of different parts of the social system.

Evaluation methods are gradually being developed to appraise the learning of a population both in the school as well as outside of the school. The new ideas on national assessment which are being developed in a number of countries are efforts to determine what has been learned in the schools, what has been learned elsewhere, and what has been learned in the interaction between the schools and other subsystems in a nation. This work is of recent development and it will be some time before

evaluators are effective in determining both the extent of the learning as well as the source.

Once again, the point is that education and educational policy makers must learn to use evaluation and evaluation data to secure a broader picture of the educational resources of a nation than may be secured from viewing the schools as the single educational resource. This is probably the most complex problem that educational evaluators and policy makers must face. The challenges faced by these broader issues suggest that international seminars and conferences may be necessary if the problems and progress of various national attempts in this field are to be studied and utilized where relevant by other national groups.

6. Implications

Educational evaluation may contribute to the improvement of education in many countries of the world. The enormous resources being expended in each country for education makes it mandatory that some forms of educational evaluation be used for appraising the effectiveness of particular aspects of a national educational program, for determining where it is in need of modification or major changes, and for determining how to maintain and even improve the effectiveness of the schools as well as the related educational resources of the nation.

The appropriate training of a cadre of highly competent educational evaluation specialists is a minimum requirement if a nation is to make effective use of this rapidly developing technology. The support of and the appropriate relations between such specialists, educational policy makers, and the educational institutions of the nation is necessary to maintain educational evaluation at a high level and to insure that the evaluation methods and results play their appropriate role in the continued maintenance and improvement of a complex educational system.

Bibliography

1. Bloom, B.S. "Implications of the IEA Studies for Curriculum and Instruction." School Review, 82 (1974): 413-35.

2. IEA Studies

   A.W. Foshay, ed., Educational Achievements of 13-Year-Olds in Twelve Countries (Hamburg: UNESCO Institute for Education, 1962).

   Torsten Husén, ed., International Study of Achievement in Mathematics: A Comparison of Twelve Countries, vols. 1, 2 (New York: John Wiley & Sons; Stockholm: Almqvist & Wiksell, 1967).

   L.C. Comber and John P. Keeves, Science Education in Nineteen Countries: International Studies in Evaluation. I (New York: John Wiley & Sons; Stockholm: Almqvist & Wiksell, 1973).

   Robert L. Thorndike, Reading Comprehension Education in Fifteen Countries: International Studies in Evaluation. III (New York: John Wiley & Sons; Stockholm: Almqvist & Wiksell, 1973).

   Alan C. Purves, Literature Education in Ten Countries: International Studies in Evaluation. II (New York: John Wiley & Sons; Stockholm: Almqvist & Wiksell, 1973).

   John B. Carroll, French as a Foreign Language in Seven Countries: International Studies in Evaluation. V (Stockholm: Almqvist & Wiksell, in press).

   E. Glyn Lewis, English as a Foreign Language in Ten Countries: International Studies in Evaluation. IV (Stockholm: Almqvist & Wiksell, in press).

   R.F. Farnen, S. Marklund, A.M. Oppenheim, and Judith V. Torney, Civic Education in Ten Countries: International Studies in Evaluation. VI (Stockholm: Almqvist & Wiksell, in press).

3. Plowden, Lady Beatrice, et al., A Report of the Central Advisory Committee on Children and Their Primary Schools. London: Her Majesty's Stationery Office, 1967.

4. Coleman, James S., et al., Equality of Educational Opportunity. Washington, D.C.: Government Printing Office, 1966.

5. Block, James H., ed., Mastery Learning: Theory and Practice. New York: Holt, Rinehart & Winston, 1971.

   Block, James H., ed., Schools, Society, and Mastery Learning. New York: Holt, Rinehart & Winston, 1974.

6. Peterson, P. A Review of the Research on Mastery Learning Strategies. Unpublished manuscript, International Association for the Evaluation of Educational Achievement, 1972. (also Stanford Center for Research and Development in Teaching, Stanford, California).

7. Bloom, B.S. Time and Learning. Thorndike Award Address, 81st Annual Convention of the American Psychological Association, Montreal, August 27, 1973.